

# EXHIBIT A

## CURRICULUM VITAE

### Matthew A. Turk, PhD

Computer Science Department and  
Media Arts and Technology Graduate Program  
University of California, Santa Barbara, CA 93106-5110  
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<http://ilab.cs.ucsb.edu>

### RESEARCH INTERESTS AND EXPERTISE:

Computer vision, human-computer interaction, augmented reality, graphics and imaging, digital media, pattern recognition, artificial intelligence, and mobile computing. Applications in vision-based and perceptual interfaces, analysis of human movement and activity, multimodal interaction, multimodal biometrics.

### PROFESSIONAL EXPERIENCE:

- |            |   |                       |
|------------|---|-----------------------|
| 2005-pres. | <b>University of California, Santa Barbara</b><br>Professor (2005-pres.), Associate Professor (2000-2005)<br>Computer Science Department and Media Arts and Technology Graduate Program<br>Co-director, Four Eyes Laboratory<br>Chair, Media Arts and Technology Graduate Program (2005-2010) | Santa Barbara, CA     |
| 2012       | <b>University of Oulu</b><br>Visiting Professor, Department of Computer Science & Engineering (Jun-Aug)   | Oulu, Finland         |
| 2011       | <b>University of Tampere</b><br>Visiting Professor, School of Information Science (Aug-Sept)  | Tampere, Finland      |
| 2003, 2004 | <b>Ecole Polytechnique Fédérale de Lausanne (EPFL)</b><br>Visiting faculty – August 2003, July 2004   | Lausanne, Switzerland |
| 1994-2000  | <b>Microsoft Research</b><br>Researcher<br>Founding member of the Vision Technology Research Group; research in vision-based human-computer interaction and perceptual user interfaces.   | Redmond, WA           |
| 1993-94    | <b>Teleos Research</b><br>Computer Scientist<br>Research in vision-based interaction with people, object recognition, mobile robots.  | Palo Alto, CA         |
| 1993       | <b>Stanford University</b><br>Lecturer<br>Computer Science Department   | Palo Alto, CA         |
| 1992       | <b>LIFIA-IMAG</b><br>Visiting Researcher<br>Research in face recognition and visual interpretation of human gestures,   | Grenoble, France      |

applications to human-computer interfaces.

- |         |  |                |
|---------|--|----------------|
| 1991    | <b>Massachusetts Institute of Technology</b><br>Postdoctoral Fellow, MIT Media Laboratory<br>Research on human face recognition for applications to security and man-machine communication; image database indexing and retrieval. | Cambridge, MA  |
| 1984-87 | <b>Martin Marietta Denver Aerospace</b><br>Senior Engineer<br>Research in vision algorithm development and implementation for mobile robot navigation (DARPA Autonomous Land Vehicle program).                                     | Denver, CO     |
| 1983-84 | <b>University of Pittsburgh</b><br>Computer Technician, Dept. of Neurophysiology<br>Electronics, image processing, and computer system support.  | Pittsburgh, PA |

#### EDUCATION:

- |         |  |                |
|---------|--|----------------|
| 1987-91 | <b>Massachusetts Institute of Technology</b><br>Ph.D. from the Media Laboratory, Vision and Modeling Group<br>Advisor: Alex P. Pentland<br><i>Thesis: Interactive-Time Vision: Face Recognition as a Visual Behavior</i><br>The thesis introduced “eigenfaces,” an appearance-based approach to face and object recognition. A prototype system was built to track and recognize people as they entered a room; the thesis showed how this approach can be used to represent, detect, and recognize other object properties such as facial expression. Papers on this work received an “Outstanding Paper” award (1991) and a “Most Influential Paper of the Decade” award (2000). | Cambridge, MA  |
| 1982-84 | <b>Carnegie Mellon University</b><br>M.S. in Electrical and Computer Engineering<br>Advisors: Matt Mason, Marc Raibert<br><i>Thesis: A Fine Motion Planning Algorithm for Robots</i><br>The thesis investigated robot manipulation planning techniques in the face of uncertainty in sensing and world modeling. A 2D planner was developed to automatically construct a plan, by reasoning in configuration space, to successfully manipulate an object along a constrained path.   | Pittsburgh, PA |
| 1978-82 | <b>Virginia Tech (VPI&amp;SU)</b><br>B.S. in Electrical Engineering, <i>magna cum laude</i><br>Senior Honors Project in computer vision. Advisor: Robert Haralick  | Blacksburg, VA |

#### TEACHING EXPERIENCE:

(\* - created course)

- 2000-pres.    *Graduate courses:* Human Computer Interaction Technologies\*, Computer Imaging\*, Mobile Imaging\*, Computer Vision, Probabilistic Models and Methods in Computer Science\*, Artificial Intelligence, Multimodal Interaction on Mobile Computing Platforms\*  
*Undergraduate courses:* Computer Graphics, Artificial Intelligence\*, Machine Learning,

- Introduction to Computer Vision, Introduction to C, C++, and Unix  
*Seminar courses:* Topics in Computer Vision, Human-Computer Interaction, A History of Computing\*, Perceptual User Interfaces\*, Visualization, Media Arts and Technology\*
- 2010 MIT – Guest lecturer, Sino-US Summer School in Vision, Learning, and Pattern Recognition (Perception, Motion, and Events), Xi'an, China
- 1993 Lecturer, Stanford University – Taught *Concurrent Programming* (CS140) in the Department of Computer Science, televised via the Stanford Instructional Television Network.
- 1990, 1991 MIT Media Lab – Co-organized and co-taught *Practical Issues in Color Processing* (4.999), lecturing on color imaging and human color vision.\*
- 1989-90 MIT – Guest lecturer at MIT Summer Course on flight simulation.
- 1989-90 Graduate Tutor at “pika,” an MIT undergraduate living group. Responsible for tutoring students in a variety of subjects.
- 1986 Created and taught *Computer Vision* course (CS-369) for the Martin Marietta Institute \*
- 1985-86 Organized weekly computer vision seminars at Martin Marietta. Lectured on topics in vision and AI.

#### HONORS AND AWARDS:

- 2014 Elected as Fellow of the IAPR (International Association for Pattern Recognition) For “contributions to computer vision and vision based interaction”
- 2013 Elected as Fellow of the IEEE (Institute of Electrical and Electronics Engineers) for “contributions to computer vision and perceptual interfaces”
- 2012 *Best Paper Award* at the 2012 International Symposium on Mixed and Augmented Reality (ISMAR), for “Live tracking and mapping from both general and rotation-only camera motion,” with S. Gauglitz, C. Sweeney, J. Ventura, and T. Höllerer
- 2012 *Best Paper Honorable Mention* at the 2012 International Conference on Human-Computer Interaction with Mobile Devices and Services (MobileHCI), for “Integrating the physical environment into mobile remote collaboration,” with S. Gauglitz, C. Lee, and T. Höllerer
- 2012 *Best Student Paper Finalist* (PhD student Victor Fragoso) at the 2012 International Conference on Image Processing (ICIP), for “Locating Binary Features for Keypoint Recognition using Noncooperative Games,” with V. Fragoso and J. Hespanha
- 2012 Selected to participate in the National Academy Keck Futures Initiative on The Informed Brain in a Digital World
- 2011 Awarded the *2011-2012 Fulbright-Nokia Distinguished Chair in Information and Communications Technologies*
- 2010 *Best Paper Award* at the 2010 IEEE International Workshop on Mobile Vision, for “Location-based augmented reality on mobile phones,” with R. Paucher
- 2006 *One of the Best Image Processing and Computer Vision Papers* in SIBGRAPI 2006, for “Dealing with multi-scale depth changes and motion in depth edge detection,” with R. Feris and R. Raskar
- 2004 *Best Paper Award* at the 2004 IEEE Workshop on Real-Time Vision for Human Computer

- Interaction, for “Fast 2D hand tracking with flocks of features and multi-cue integration,” with M. Kölsch
- 2004 *Communication and Technology Top Paper Award*, for “Non-zero sum gaze and persuasion,” with J. Bailenson, A. Beal, J. Blascovich, and J. Loomis; selected for presentation at the 54th Annual Conference of the International Communication Association (2004)
- 2000 *Most Influential Paper of the Decade Award* from the International Association for Pattern Recognition (IAPR) Workshop on Machine Vision Applications (MVA-2000)
- 1999 Selected to attend the National Academy of Engineering Symposium on Frontiers of Engineering (one of 70 chosen nationwide)
- 1992 Selected to attend *Comparative Approaches to Cognitive Science* international summer school (with scholarship)
- 1991 C.N.O.U.S. post-doctoral fellowship grant (France)
- 1991 IEEE Computer Society Outstanding Paper Award, Conference on Computer Vision and Pattern Recognition (CVPR), for “Face recognition using eigenfaces,” with A. Pentland
- 1988-90 SPIE Scholarships in Optical Engineering
- 1990 MIT Japan Science, Technology, Management Prize
- 1988 Author of the Year award, Martin Marietta Information Systems , for “VITS – a vision system for autonomous vehicle navigation,” with D. Morgenthaler, K. Gremban, and M. Marra
- 1978-82 Marshall Hahn Engineering Scholarship (Virginia Tech)

#### **PROFESSIONAL ACTIVITIES AND SERVICE:**

- Associate Editor, ACM Transactions on Intelligent and Interactive Systems (2009-present)
- Associate Editor, Journal of Image and Vision Computing (2006-present)
- Associate Editor, International Journal of Computer Vision and Signal Processing (2011-present)
- Guest Editor, Special Issue on Behavior Understanding for Arts and Entertainment, ACM Transactions on Interactive Intelligent Systems (to appear)
- Guest Editor, Special Issue on Machine Learning for Vision Based Motion Analysis, Journal of Image and Vision Computing (2012)
- Guest Editor, Special Issue on Real-World Face Recognition, IEEE Transactions on Pattern Analysis and Machine Intelligence (PAMI) (2011)
- Guest Editor, Special Issue on Mobile Computer Vision, International Journal of Computer Vision (2011)
- Chair, ICMI Advisory Board (2006-2009)
- Chair, IEEE PAMI-TC Open Access Committee (2013)
- Member, ICMI Advisory Board (2003-present)
- Member, Traumatic Brain Injury Resource Optimization Center Advisory Board (2008-present)
- Member, STEAM Advisory Council, Santa Barbara Children’s Museum (2012-present)

Advisory Group Member, National Institute on Disability and Rehabilitation Research (NIDRR) Field Initiated Program research study on Cognitive Support Technologies for Traumatic Brain Injury, (2013-present)

Member, IEEE Automatic Face and Gesture Recognition Steering Committee (2011-present)

Member, IEEE International Conference on Social Computing Steering Committee (2010-present)

Member, Digital Media Executive Committee, UC Industry-University Cooperative Research Program (IUCRP) (2006-2009)

Research Council member, UC Digital Media Innovations Program (2001-2003)

Member, External Review Committee for Korean Institute of Science and Technology (2009)

Member, NSF Committee of Visitors for CISE-IIS (2005)

Member, DARPA IXO Immersive Operations Planning Panel (2006-2007)

Advisory Board member, CHIL European Commission Project (2005)

Award Committee, Outstanding Young Researcher in Automatic Human Behaviour Analysis (2011)

Co-founder, Workshop on Multimodal User Authentication (2003)

Founder, Workshop on Perceptual User Interfaces (1997)

IEEE Fellow, IAPR Fellow, ACM Senior Member

Conference and Workshop Organization:

IEEE Conference on Computer Vision and Pattern Recognition (General Chair 2014, Area Chair 2001, 2007, 2009, 2012)

International Conference on Informatics, Electronics & Vision (General Chair 2012, 2013, 2014)

IEEE Conference on Automatic Face and Gesture Recognition (Special Session Chair 2008, 2013, General Chair 2011, Test of Time Award Committee 2013)

IEEE International Workshop on Mobile Vision (2010, 2011, 2013, 2014)

ACM Conference on Multimedia (General Chair 2006)

International Conference on Multimodal Interfaces (ICMI) (General Chair 2008, Paper Awards Committee Chair 2007, 2008, Program Chair 2004, Area Chair 2005, 2006, Publicity Chair 2010)

ACM CHI (Area Chair 2001, Area Chair 2013, Associate Chair for CHI Notes 2006)

IEEE Workshop on CVPR for Human Communicative Behavior Analysis (2008, 2009, 2010, 2011)

IEEE Workshop on Machine Learning for Vision-Based Motion Analysis (2011)

Workshop on Media Arts, Science, and Technology (2009)

Workshop on Perceptual User Interfaces (1997, 1998)

Workshop on Perceptive User Interfaces (2001)

Workshop on Multimodal User Authentication (2003, 2006)

Workshop on Applications of Computer Vision (Area Chair 2005)

DiMI Workshop on Perceptive Animated Interfaces (2003)

NSF Virtual Human Workshop (2004)

Recent program committees (2005-2014):

IEEE Conference on Computer Vision and Pattern Recognition (CVPR) (2005-2013)

IEEE International Conference on Computer Vision (ICCV) (2005, 2007, 2009, 2011, 2013)

European Conference on Computer Vision (ECCV) (2006, 2008, 2010)

International Conference on Multimodal Interfaces (ICMI 2007, 2008, 2009, 2010, 2011)

ACM CHI (2013)

International Conference on Pattern Recognition (2006, 2008, 2010)

IEEE Conference on Automatic Face and Gesture Recognition (2006, 2008)  
ACM Conference on Multimedia (2007, 2009, 2011)  
Asian Conference on Computer Vision (2012)  
ACM/IEEE International Conference on Distributed Smart Cameras (2007)  
International Conference on Multimedia & Expo (2008)  
International Conference on Immersive Technologies (2007)  
International Conference on Robotics and Automation (2006)  
International Conference on Pattern Recognition (2010)  
International Conference on Advances in Pattern Recognition (2005)  
International Conference on Biometrics Authentication (2006)  
IAPR International Conference on Biometrics (2012)  
International Conference on Computer Vision Theory and Applications (2006, 2008)  
IAPR Conference on Machine Vision Applications (2005)  
International Joint Conference IBERAMIA/SBIA (2006)  
SIBGRAPI – Conference on Graphics, Patterns, and Images (formerly Brazilian Symposium on Computer Graphics and Image Processing) (2006, 2007, 2011, 2012)  
International Conference on Affective Computing and Intelligent Interaction (2009)  
International Conference on Intelligent User Interfaces (2009)  
International Conference on Social Computing (SocialCom 2011, 2012, 2013, 2014)  
ASE/IEEE International Conference on Social Informatics (2012)  
  
Workshop on Intelligent Mobile Vision (2012, 2013)  
Workshop on Cognitive Engineering for Mobile GIS (2011)  
First International Workshop on Re-Identification (2012)  
International Workshop on Wide Spectrum Social Signal Processing (2012)  
International Audio/Visual Emotion Challenge and Workshop (2011)  
International Workshop on Benchmarking Facial Image Analysis Technologies (2011)  
International Workshop on Sign, Gesture and Activity (2010, 2011)  
ACM Workshop on Mobile Cloud Media Computing (2010)  
ECCV Workshop on Human Motion: Understanding, Modeling, Capture and Animation (2010)  
ECCV Workshop on Parts and Attributes (2010)  
IEEE Workshop on Socially Intelligent Surveillance and Monitoring (2010, 2011, 2012)  
Joint Workshop on Machine Learning and Multimodal Interaction (2008)  
Workshop on Machine Learning for Vision-based Motion Analysis and Understanding (2008, 2009)  
IEEE International Workshop on Human Computer Interaction (2009)  
Workshop on Applications of Computer Vision (2009, 2011, 2013, 2014)  
Workshop on Machine Learning for Affective Computing (2011)  
IEEE Workshop on CVPR for Human Communicative Behavior Analysis (2008)  
International Symposium on Visual Computing (2005)  
IEEE Workshop on Face Processing in Video (2005)  
IEEE Workshop on Video Processing for Security (2006)  
IEEE Workshop on Video Processing and Recognition (2007)  
IEEE Workshop on Vision for HCI (2005)  
International Workshop on Human-Computer Interaction (2006, 2007)  
International Workshop on the Tangible Space Initiative (2006, 2007)  
IEEE Workshop on Modeling People and Human Interaction (2006)  
International Workshop on Analysis and Modelling of Faces and Gestures (2005, 2007)  
IJCAI Workshop on Artificial Intelligence for Human Computing (2007)  
ACM Workshop on Human-Centered Multimedia (2006, 2007)  
IEEE Workshop on Motion and Video Computing (2006)



Workshop on Component Analysis Methods for Classification, Clustering, Modeling and Estimation Problems in Computer Vision (2007, 2009)  
Workshop on Human Motion: Understanding, Modeling, Capture, and Animation (2007)  
International Workshop on Human Behavior Understanding (2010)  
Workshop on Human Motion: Understanding, Modeling, Capture, and Animation (2007)

## **REVIEWING ACTIVITY:**

### Funding proposal and program reviewing:

External review committee, the Korean Institute for Science and Technology (KIST) (2009)  
The Academy of Finland, Centre of Excellence in Research (2010)  
Fellowship Evaluator for Center for Advanced Study in the Behavioral Sciences at Stanford University (2014)  
The Fundacao para a Ciencia e a Tecnologia (FCT), Portugal (2010)  
Singapore National Science and Technology Award (2008, 2009)  
NSF Review Panels (2003-pres): Computer Vision (regular and CAREER), Human-Computer Interaction, IIS Large Grants, SBIR, Graphics and Visualization, Expeditions in Computing, CreativeIT  
U. S. Army (2004, 2005, 2008)  
UC Discovery Program (2001, 2002, 2005-2009)  
Netherlands Organisation for Scientific Research (2004, 2011)  
Netherlands e-Science Center (2012)  
Israel Science Foundation (2004, 2012)  
NSF CISE Area Study (2005)  
National Geospatial-Intelligence Agency (2009)  
Research Grants Council of Hong Kong (2006, 2011)  
W. M. Keck Foundation 2007

### Journal and other reviewing:

IEEE Transactions on Pattern Analysis and Machine Intelligence  
IEEE Transactions on Robotics and Automation  
IEEE Transactions on Information Forensics and Security  
IEEE Transactions on Visualization and Computer Graphics  
IEEE Transactions on Multimedia  
IEEE Transactions on Affective Computing  
IEEE Transactions on Neural Networks  
IEEE Transactions on Image Processing  
IEEE Transactions on Systems, Man and Cybernetics - Part B  
IEEE Transactions on Vehicular Technology  
International Journal of Computer Vision  
Journal of Computer Vision and Image Understanding  
Image and Vision Computing  
Pattern Recognition  
Pattern Recognition Letters  
International Journal of Pattern Recognition and Artificial Intelligence  
Human Computer Interaction  
Artificial Intelligence  
Applied Artificial Intelligence  
Neural Computation  
Journal of Machine Learning Research



International Journal of Semantic Computing  
 Communications of the ACM  
 Cartography and Geographic Information Science  
 IEEE Signal Processing Magazine  
 Encyclopedia of Computer Science  
 SIGIR Best Papers Selection Committee  
 ACM SIGGRAPH  
 Eurographics Multimedia  
 ICME  
 ACM UIST  
 International Symposium on Mixed and Augmented Reality  
 ACM Symposium on Interactive 3D Graphics  
 Bayesian Networks and Decision Graphs, Second Edition (book evaluation)

# **UNIVERSITY SERVICE:**

2014-pres.	Faculty Affiliate, UCSB Center for Digital Games Research
2013-pres.	Member, Executive Council, SAGE Center for the Study of the Mind
2012-pres.	Chair, CS Web and Public Relations Committee
2012-pres.	Member, UCSB Interdisciplinary Graduate Program in Dynamical Neuroscience
2011-pres.	Member, UCSB Committee on Privilege and Tenure
2011-pres.	Chair, CS Public Relations Committee
2002-pres.	Member, Steering Committee, Cognitive Science Program
2005-pres.	Member, College of Engineering Administrative Committee
2001-pres.	Member, Steering Committee, Center for Information Technology and Society (CITS)
2008-pres.	Member, Executive Committee, UCSB Center for Spatial Studies
2013-2014	Member, MAT Curriculum Committee
2012-2013	Chair, MAT Graduate Admissions Committee
2012-2013	Chair, CS Business Officer Search Committee
2012-2013	Member, CS Strategic Council
2011-2012	Member, MAT Graduate Admissions Committee
2007-2009	Member, UCSB Council on Planning and Budget
2005-2010	Chair, Media Arts and Technology Graduate Program
2005	Vice Chair, Media Arts and Technology Graduate Program
2005-2010	Chair, MAT Web and Public Relations Committee
2004-2006	Chair, MAT By-Laws Committee
2003-2007	Co-Chair, MAT Colloquium Series Committee
2006-2010	Chair, MAT Curriculum Committee
2005-2010	Founding Member, Transliterations Project
2006-2010	Member, CNSI Administrative Committee
2006	Member, Academic Personnel Ad Hoc Committee
2004-2007	Member, CS Graduate Admissions Committee
2003-2005	Chair, CS Graduate Affairs and Advising Committee
2003-2005	CS Graduate Advisor
2002-2005	Member, Central Fellowships Committee
2002	Member, Dissertation Awards Committee
2001-2004	Member, UCSB Graduate Council
2001-2002	Member, CS External Relations Committee
2001-2002	Chair, MAT Graduate Admissions Committee

2007-2008 Chair, MAT Faculty Search Committee  
2007-2008 Member, MAT Graduate Admissions Committee  
2000-2002 Member, CS Faculty Search Committee  
2007-2008 Member, CS Faculty Search Committee  
2000-2001 Chair, CS External Relations Committee

**STUDENTS SUPERVISED:**

**Postdoctoral researcher supervised:**

Changbo Hu (2001-2003)  
Ismo Rakkolainen (2004-2006)  
Jae Sik Chang (2005-2007)  
Chunghoon Kim (2007-2009)  
Masahiro Toyoura (2008-2009)  
Erno Makinen (2009)  
Stefan Arisona (2007-2008)

**Additional Visitors Supervised:**

Janne Heikkela (University of Oulu, Finland) (2013)  
Jari Hannuksela (University of Oulu, Finland) (2013)  
Christine Chen (2010-2011)  
Sven Dickinson (on sabbatical from University of Toronto) (2010-2011)  
Hang-Bong Kang (on sabbatical from Catholic University, Korea) (2005-2006, 2010-2011)  
Marc Petter (2010-2011)  
Remi Paucher (2009)  
June-Ho Yi (on sabbatical from Sungkyunkwan University, Korea) (2003-2005)  
Miao Mao (2011-2012)  
Yuta Suzuki (2011)  
Erina Ishikawa (2012-2013)  
Selan Rodrigues dos Santos (on sabbatical from the Federal University of Rio Grande do Norte, Brazil) (2012-2013)

**Ph.D. Thesis Committees Chaired:**

Mathis Kölsch, 2004  
Rogerio Feris, 2006  
Ya Chang, 2006  
Haiying Guan, 2007  
Longbin Chen, 2010  
Daniel Vaquero, 2012  
Dianna Han, current  
Steffen Gauglitz (co-chair), current  
Victor Fragoso, current  
Emily Fujimoto, current  
Chris Sweeney (co-chair), current  
Domagoj Baricevic, current  
Ben Nuernberger, current

**Other Ph.D. Thesis Committees:**

*UCSB Computer Science:*

Dusty Sargent, Tolga Can, Hangjin Zhang, Chang-Ming Tsai, Chao-I Chen, Wen-Yen Chen,  
Imran Patel, Cha Lee, Stephen DiVerdi, Jason Wither, Yi Gong, Brynjar Gretarsson, Christopher

Coffin, Jiejun Xu, Jonathan Ventura, Saiph Savage, Byungkyu Kang  
*UCSB Electrical and Computer Engineering:*

Ganu Wu, Zifeng Ni, Mei-Chen Yeh, Sandeep Bhat, Xin Yang, Stephen Mangiat, Zefeng Ni,  
Santhoshkumar Sunderrajan, Yi-Chu Wang, Samuel Beach, Chieh Lee

*UCSB Media Arts and Technology:*

Dan Overholt, Mark Daggett, Lance Putnam, Ivana Andjelkovic, Javier Villegas, Basak Alper

*External committees:*

Rainer Steifelhagan, University of Karlsruhe, Germany

Sebastien Grange, EPFL, Switzerland

José Marques Soares, Institut National des Télécommunications, France

Shaokang Chen, The University of Queensland, Australia

Ryan Cassel, University of Paris XI, France

Erno Mäkinen, University of Tampere, Finland

Tao Wang, University of British Columbia (external examiner)

Andrew Rutgers, University of British Columbia

Akshay Asthana, Australian National University

**M.S. Thesis Committees Chaired:**

Chih-yu Yao, 2006

Bhaskar Rao, 2005

Vishal Nayak, 2005

Sarah Stuckey, 2007

Gargi Shah, 2008

Melissa De Bartolomeo, 2008

Melissa Carrasco, 2009

Sharath Venkatesha, 2009

Matt Stabile, 2010

Marcus Jang, 2010

Justin Muncaster, 2010

Eyrun Eyjolfssdottir, 2011

Devdeep Roy Choudhury, 2012

Nataly Moreno, current

**Undergraduate Research Directed:**

Shai Perry, 2004-2005

Alaa Gharbawi, 2005

Akhsar Kharebov, 2004-2005

Eugene Dvortsov, 2004

Paul Elliot, 2005

Saara Kamppari, 2005-2006

Brian Graham, 2006-2007

Jeffrey Flanagan, 2007

Russ McLoughlin, 2008-09

Wendy Chun, 2009-10

Ben Alun-Jones, 2009-10

Jonathan Chu, 2010-12

Alexander Hsu, 2011-12

Cindy Lu, 2011-12

Matthew Garcia, 2011-12

Brandon Rude, 2012

Leif Dreizler, 2012  
 Zachary Sperske, 2012  
 Kristen Morse, 2012-13  
 Jhon Faghih-Nassiri, 2013

# **RECENT INVITED TALKS:**

Dec 2014	(Scheduled) Keynote speaker, 17 <sup>th</sup> International Conference on Computer and Information Technology (Dhaka, Bangladesh)
Jan 2014	Gsolutionz, Inc. (Carpinteria, CA)
Dec 2013	Panelist, ICCV Workshop on Visual Commerce
Oct 2013	Ohio State University
Jul 2013	Google (Mountain View, CA)
Apr 2013	Amazon (Seattle, WA)
Sept 2012	Proceedings of the IEEE 100 <sup>th</sup> Anniversary Forum on Improving Quality of Life Through Engineering Innovations (scheduled keynote)
Aug 2012	University of Oulu, Finland
May 2012	Hong Kong University of Science and Technology (Invited workshop talk)
Apr 2012	Qualcomm Research (San Diego, CA)
Aug 2011	University of Oulu, Finland
Aug 2011	University of Tampere, Finland
Aug 2011	Nokia Innovation Center, Tampere, Finland
Apr 2011	University of Texas, Austin
Mar 2011	Keynote speaker, Infoplosion Symposium (Tokyo, Japan)
Mar 2011	University of Kyoto
Feb 2011	University of Houston
Jan 2011	University of California, Riverside
Nov 2010	15th Ibero-American Congress on Pattern Recognition [Keynote] (Sao Paulo, Brazil)
Sept 2010	IEEE Fourth International Conference On Biometrics: Theory, Applications And Systems [Keynote] (Washington, D.C.)
Jul 2010	Lecturer, Sino-USA Summer School in Vision, Learning and Pattern Recognition (Xi'an, China)
Feb 2010	University of Denver (Denver, CO)
Apr 2010	Rensselaer Polytechnic Institute (Troy, NY)
Jun 2009	Nokia Research Center, Palo Alto (CA)
Aug 2008	University of Sao Paulo (Brazil)
May 2008	University of Southern California (Los Angeles, CA)
Mar 2008	COSYNE Workshop on Dynamic Faces (Snowbird, UT)
Feb 2008	Virginia Tech (Blacksburg, VA)
Dec 2007	University of Tampere (Finland)
Sept 2007	Infocomm Horizons Seminar 2007 (Singapore)
Sept 2007	Institute for InfoComm Research (Singapore)
May 2007	Northwestern University (Evanston, IL)
May 2007	Michigan State University (East Lansing, MI)
Feb 2007	DARPA (Arlington, VA)
Jan 2007	Northwestern University (Evanston, IL)

# **GRANTS AND CONTRACTS:**

2012-2015 “Telecollaboration in Physical Spaces,” NSF (PI), \$499,970

2012-2015	“Interactive Panoramas on Google Glass,” Google Glass Research Awards Program (Co-PI), \$18,000 + \$4500 equipment gift (in-kind)
2011-2012	Equipment gift (in-kind), NVIDIA Research, Tegra Tablet, \$1500
2009-2013	“CRI: Equipping the Allosphere, an Environment for Immersive Data Exploration,” NSF (PI), \$749,894
2010	Research and equipment gift funding, Nokia Corp., \$9,600
2009	Equipment gift (in-kind), Nokia Corp., \$11,033
2009	Equipment gift (in-kind), HRL Labs, \$16,832
2009	Research gift funding, Nokia Corp., \$10,000
2008-2011	Internal funding for Allosphere facility and research, UCSB (PI), \$622,052
2008-2011	“MRI: Development of the Allosphere, an Immersive Instrument for Scientific Exploration,” NSF (PI), \$500,000
2008-2009	“Scalable Visualization and Constrained Interaction for Large Graphs – Supporting the Collaborative Analysis of High-dimensional Data Sets,” NSF (Co-PI), \$263,000
2006-2007	“Scalable Visualization and Constrained Interaction for Large Graphs – Supporting the Collaborative Analysis of High-dimensional Data Sets,” NSF (Co-PI), \$230,000
2008-2009	“Multimodal Wireless Sensor Network Infrastructure,” DARPA (Key personnel), \$655,174
2006-2007	“Scalable Visualization and Constrained Interaction for Large Graphs,” DOD/NSF (Co-PI), \$234,321
2006-2007	“A Tangible Interaction Window between Korea and the United States,” Korean Institute of Science and Technology (Co-PI), \$99,804
2006	“Foundations of Multimedia Research,” UC Opportunity Award, \$14,950
2005-2008	“Detecting and Analyzing Discontinuities in Computer Vision,” NSF (PI), \$328,303
2003	Microsoft unrestricted gift, \$65,000
2003	“STTR Phase I: Sensors and Methods to Handle UAV,” U.S. Navy Air Systems Command (PI, subcontract to Develosoft Corp.), \$21,000
2003	Lawrence Livermore Laboratory UCRP Award (PI), \$40,000
2003	Microsoft Research Learning Science and Technology (co-PI), \$40,000
2003	Mitsubishi Equipment Gift, \$650
2003	UCSB Instructional Improvement Grant (PI), \$12,150
2003	DiMI Opportunity Award (PI), \$14,000
2003	Microsoft Equipment Gifts, \$50,000
2003-2008	NSF, “Digital Multimedia IGERT: Graduate Training Program in Interactive Digital Multimedia” (Co-PI), \$3,000,000
2002-2005	NSF, “ITR: Using Virtual Environment Technology to Understand and Augment Social Interaction” (Co-PI), \$1,100,000
2002	UCSB Research Across Disciplines (Co-PI), \$14,400
2002	UCSB Research Across Disciplines (Co-PI), \$11,000
2001	DiMI Opportunity Award (Co-PI), \$8000

# **CONSULTING:**

2014-pres	Gardner Linn Burkhart & Flory, LLP (Grand Rapids, MI) Expert consultant for patent case involving computer vision for automobiles
2014	Cooley, LLP (Boston, MA) Expert consultant for European patent application appeal on biometrics for financial transactions.

2013-2014 Cooley, LLP (San Diego, CA)  
Expert witness for patent litigation in case covering image matching and classification.

2013 Bristows, LLP (London, U.K.)  
Expert witness for patent litigation in case covering imaging, gaming, and virtual reality.

2012-pres Birch, Stewart, Kolasch & Birch, LLP (Falls Church, VA)  
Expert witness for patent litigation in case covering face recognition and gaming technologies.

2011-2013 3DiVi Inc. (Chelyabinsk, Russia) – 3D gesture recognition

2011-2012 Quinn Emanuel Urquhart & Sullivan, LLP (San Francisco, CA)  
Expert witness for patent litigation in mobile image display and multimedia technologies

2011-2012 InTouch Health, Inc. – Computer vision

2010 Thompson Coburn, LLP (St. Louis, MO)

2006-2007 Booz, Allen, and Hamilton (Arlington, VA)

2009 Scholastic, Inc.

2007 I2R, Singapore

2006 Capstone Press for Inventions and Discovery

2005 National ICT Australia (NICTA), Sydney, Australia

2004 Biometrics Engineering Research Center, Yonsei University (Korea)

2004 Korea Institute of Science and Technology (KIST), Seoul, Korea

2004 Samsung Corporation (Korea)

2001 Toyon Corporation (Santa Barbara)

2000 Startup company managed by incubator Global Technology (Los Angeles)

#### **PATENTS:**

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1992 US Patent #5,164,992: “A Face Recognition System,” with A. Pentland

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2005 “Depth Edges in Real Time using Multi-Flash Camera,” A. Agrawal, V. Branzoi, R. Chellappa, R. Feris, R. Raskar, K. Tan, and M. Turk, CVPR, New York, 2005.

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